

18. DIABETES

Number	Objective
1	Type 2 diabetes
2	Diabetes prevalence
3	Diagnosis of diabetes
4	Diabetes-related deaths
5	Diabetes-related deaths among known persons with diabetes
6	Cardiovascular deaths
7	Perinatal mortality in infants of mothers with diabetes
8	Congenital malformations in infants of mothers with diabetes
9	Foot ulcers
10	Lower extremity amputations
11	Visual impairment
12	Blindness
13	Proteinuria
14	End-stage renal disease
15	Lipid assessment
16	Glycosylated hemoglobin measurement
17	Urinary measurement of microalbumin
18	Controlled blood pressure
19	Dilated eye examinations
20	Foot examinations
21	Aspirin therapy
22	Self-blood glucose monitoring
23	Diabetes education

Diabetes

Goal

Reduce needless disease and economic burden for all persons with, or at risk for, diabetes mellitus.

Terminology

(A listing of all acronyms used in this publication appears on page 27 of the Introduction.)

Diabetes Mellitus (diabetes): A chronic disease due to insulin deficiency and/or resistance to insulin action and associated with hyperglycemia. Over time, unless properly treated, organ complications related to diabetes develop, including heart, nerve, foot, eye, and kidney damage and problems with pregnancy.

Types of diabetes: Diabetes is classified into four major categories:

1. Type 1 diabetes (previously called insulin-dependent diabetes mellitus [IDDM] or juvenile-onset diabetes [JODM]) represents clinically about 5 percent of all persons with diagnosed diabetes. Its clinical onset is typically at ages under 30 years and it is an autoimmune destructive disease in beta (insulin-producing) cells of the pancreas in genetically susceptible individuals. The clinical onset of Type 1 diabetes may be more gradual after age 30. Insulin therapy is always required for both life and diabetes control.
2. Type 2 diabetes (previously called non-insulin-dependent diabetes mellitus [NIDDM] or adult-onset diabetes [AODM]) is the most common form of diabetes in the United States and the world, especially in minority communities and the elderly. In the United States, approximately 95 percent of all persons with diagnosed diabetes (10.5 million) and 100 percent of undiagnosed (5.5 million) diabetes have Type 2 diabetes.
3. Other Types—A number of other causes of diabetes are recognized, including genetic abnormalities, pancreatic diseases, and medication use.
4. Gestational Diabetes Mellitus (GDM)—The recognition of hyperglycemia during pregnancy in an individual not previously known to have diabetes. Approximately 3 percent of all pregnancies are associated with GDM. GDM identifies health risks to the fetus/newborn and future diabetes in the mother.

Prevention: Primary: stopping/delaying onset of diabetes; Secondary: stopping/delaying onset of complications; Tertiary: stopping disability from disease/complications.

Complications: Microvascular: small vessel abnormalities in eye and kidney; macrovascular: large vessel abnormalities in heart, brain, and legs; metabolic: abnormalities in nerves and during pregnancy.

Overview

Current Situation

Presently, diabetes, especially Type 2 diabetes, as well as associated diabetes complications, are substantially increasing both in the United States and throughout the world.^{1,2} The number of individuals

with known diabetes has been steadily increasing, especially within minority communities.³ It is now a very common disease, with approximately 800,000 new cases each year, or 2,200 new cases each day.⁴ Diabetes remains the seventh cause of death in the United States, primarily from cardiovascular disease. Usual protective elements against cardiovascular disease, such as female gender, are negated in the presence of diabetes. In the United States, diabetes is the leading cause of nontraumatic amputations (approximately 157,000/year or 150/day); blindness among working-age adults (approximately 20,000/year or 60/day); and end-stage kidney disease (approximately 30,000/year or 70/day). Diabetes contributes to impaired quality of life and substantial disability.⁵ Finally, diabetes is a very costly disease, overall and in persons over 65 years of age, with recent estimates of the total attributable cost of diabetes being around \$90 billion (\$43 billion direct; \$45 billion indirect).⁶ Compared to previous cost estimates, the frequency and duration of inpatient care has decreased, but the number of outpatient visits and nursing home days has been increasing.

Diabetes is a major clinical *and* public health challenge, especially in minority communities where both the prevalence of diabetes and the risk of devastating associated complications is substantially greater than in the majority community.^{7,8} These realities are especially disturbing, given validated efficacy and economic studies of secondary prevention (e.g., glucose, lipid, and blood pressure regulation) and tertiary prevention (e.g., screening for early diabetes complications [eye, foot, and kidney abnormalities], followed by appropriate treatment and prevention strategies).⁹⁻¹⁵ For multiple reasons, however, these scientifically and economically justified prevention programs are not being routinely used in daily practice.¹⁶⁻¹⁸

In summary, diabetes is a big problem; will get bigger in the future; and is associated with disparities among various populations in the devastation due to diabetes, as well as efficacious prevention strategies. Diabetes is thus a “wasteful” disease because the strategies that would attenuate the burden of diabetes are not being widely or regularly utilized in daily care.

Dynamics of the Problem

Status Today

Evidence is convincing that diabetes is a major disease challenge for the United States, one that certainly will worsen before it improves, especially in vulnerable, high-risk populations: African Americans; Hispanics; American Indians/Alaska Natives; Asian/Pacific Islanders. There are several factors accounting for this chronic disease epidemic.¹⁹⁻²²

Factors that contribute to this increasing burden include:

1. **Improper Nutrition.** In association with “westernization,” (which includes a diet high in high-fat and processed foods), a considerably greater number of persons are overweight in the United States today, especially within minority communities, e.g., African-American females.^{23,24} Obesity, improper nutrition, and lack of physical activity (see below) are occurring in persons younger than 15 years of age, perhaps explaining the reporting of Type 2 diabetes in young teenagers.²⁵
2. **Decreased Physical Activity.** The amount of physical activity in the United States has been decreasing steadily for all segments of the populations.²⁶

3. Demographics

Aging. The prevalence of diabetes is greater in older individuals.²⁷ While the exact mechanisms are not known, increased insulin resistance with gradual deterioration in beta cell function may account for this phenomenon. As the population in the United States ages, especially in the number of persons living in the sixth and seventh decades of life, an increase in the prevalence of diabetes would be expected. However, while recent epidemiologic studies indicate that aging is not a major factor in the substantial increase in the number of persons with diabetes,²⁸ present and future treatment will be associated with a greater lifespan for persons with diabetes.

Population Growth. The make-up of the U.S. population is changing dramatically and the proportion of minorities will increase substantially: By 2005, almost 50 percent of the population will be other than white—51 percent white; 26 percent Hispanic; 14 percent African American; and 8 percent Asian. Certain minority communities, especially populations at greater risk for diabetes and associated complications, such as Hispanics, African Americans, and American Indians, have been experiencing high growth rates. In association with concomitant obesity and inactivity, the very populations most experiencing the challenges of diabetes will be increasing in number over the next few decades.²⁹

4. Ascertainment. Diabetes has been known as the “hidden” disease, i.e., millions of persons have the condition, although it is not diagnosed,^{30,31} complications and health services associated with diabetes are frequently not recorded on death certificates,³² hospital discharge forms,³³ emergency room system paperwork, and other documents. Much of the past “missing” burden of diabetes is now being increasingly captured due to improved surveillance and data systems,³⁴ including check-off boxes on data forms for the presence of diabetes and screening programs for undiagnosed diabetes in high-risk persons.³⁵ Thus, the real, but previously undocumented, burden of diabetes is now being made explicit.

Major Determinants

Several interrelated factors influence the present and future burden of diabetes:

1. Genetics. Both Type 1 and 2 diabetes have a significant genetic component.^{36,37} For Type 1 diabetes, genetic markers that indicate a greater risk for this condition have been identified that are sensitive, but not specific. Type 2 diabetes, especially in vulnerable minority populations, may be associated with a “thrifty gene.”³⁸ Family and twin studies demonstrate considerable penetrance for Type 2 diabetes, but specific genetic abnormalities for “common” Type 2 diabetes have not been identified. The degree to which such genetic indicators can be both validated and clinically available will determine effectiveness of primary prevention trials.^{39,40}
2. Culture/Community Traditions. Patient behaviors are largely influenced by beliefs and attitudes, and these are greatly affected by community and/or cultural traditions.^{41,42} In many minority communities, fatalism, use of alternative medicine, desirability of rural living conditions, and other factors will significantly influence both availability of health care and capabilities of the individual with diabetes in his or her own care. Thirteen percent of the total United States population speaks a language at home other than English. Cultural and linguistic factors do affect interactions with health care providers and the system. The degree to which diabetes prevention strategies recognize and incorporate these traditions will largely determine program effectiveness.
3. Social/Economic Factors. The influence of socioeconomic status (SES) in the incidence and

progression of chronic diseases is increasingly recognized.⁴³⁻⁴⁵ Chronic diseases such as diabetes reflect the social fabric of our society, and the degree to which employment, security, education, and availability of health care are addressed and improved within the United States will greatly influence the likelihood of developing Type 2 diabetes, as well as effectively managing both types of diabetes.⁴⁶

4. **Nature of Chronic Diseases.** Experiences with infectious diseases have established a “dichotomous” and treatment view of health, i.e., one is either healthy or dead! Mortality, or quantity of life, has been the ultimate marker of disease burden. Chronic diseases such as diabetes pose substantially different challenges because “gray areas,” e.g., doing “better,” become valid indicators of health improvement. Quality of life and degree of disability are important indicators for chronic disease. Further, a variety of health care professionals (e.g., nurses, pharmacists) and non-health care professionals (e.g., ministers, government officials, employers) are involved in critical decisions affecting chronic diseases. Diabetes, like other chronic conditions, is long term and impacts the environment where people live, work, and play. For diabetes, the degree to which we can accurately measure quality of life and/or incorporate many nonphysicians on the health team will dictate our ability to both recognize and deal with the nature of a disease such as diabetes.^{47,48}
5. **Scientific Breakthroughs.** The rapidity and utility of scientific discoveries will substantially dictate our ability to control the diabetes burden. Whether in basic, clinical, applied, epidemiologic, psychologic, economic, or engineering investigation, important observations have been made and will continue to occur in diabetes. When these discoveries will occur and the nature of the observations are largely unknown. However, it is clear that future scientific results will greatly influence the prevention and management of diabetes;⁴⁹ and any scientific study that is not translated and used in daily practice is ultimately “wasted.”^{50,51}
6. **Health System, Including Health Care Professionals.** The nature and availability of a responsive and effective health care system will determine capabilities to ensure access to quality care, especially in secondary and tertiary prevention.^{52,53} With the emergence of managed care, a person with diabetes could receive effective, economical, and planned preventive care that would minimize the diabetes burden.⁵⁴ Further evolution of managed care, such as protection against adverse selection practices and excessive litigation constraints, needs to occur before this opportunity becomes a reality.

In addition, the apparent movement toward primary care will greatly affect diabetes management and outcomes. At present, about 90 percent of all persons with diabetes receive their continuous care from the primary care community. This movement is highly unlikely to change in the future. Thus, to the degree that improved relationships can be established between diabetes specialists and primary care health providers will largely determine the quality of diabetes care.⁵⁵

7. **Individual Behavior in Community Settings.** Ultimately, people with diabetes spend a very small percentage of their time in contact with health professionals. In addition to family, friends, and work colleagues, individual patient knowledge, beliefs, and attitudes will greatly affect diabetes management and outcomes. Our ability to understand and influence individual behaviors will significantly influence the success of preventive programs in diabetes.^{56,57}

Disparities in Health

Considerable differences exist in the prevalence and incidence of diabetes and associated complications in the United States. In general, racial, ethnic, and chronological minority communities—African Americans, Hispanics, American Indians, and certain Pacific Islander and Asian American groups, as well as older Americans—suffer disproportionately compared to the white population.

1 Particularly within minority communities, there are four possible reasons for the greater devastation of
2 diabetes:

- 3
4 1. Greater prevalence of diabetes, i.e., if diabetes is more common, then one would expect greater
5 mortality, amputations, and complications from this diabetes.
6
- 7 2. Greater seriousness of diabetes, i.e., the hyperglycemia is worse or other serious comorbid conditions,
8 e.g., hypertension, exist to complicate the presence of diabetes. Many factors could be involved in
9 this reason, including genetics and weight. “Greater seriousness” of diabetes can be determined by
10 comparing, for example, mortality or amputation rates/persons with diabetes rather than per the
11 general population.
12
- 13 3. Inadequate access to proper diabetes prevention and control programs. If diabetes services such as
14 education and eye evaluation are not available, then efficacious programs to reduce the burden of
15 diabetes will not be accessed and used. Many diabetes “at-risk” groups reside in medically
16 underserved areas and/or are non- or underinsured.
17
- 18 4. Improper quality of care, i.e., even if diabetes management services were available, if the quality of
19 that service were inadequate, prevention programs would not be effective.
20

21 It is important to identify the reasons for disparities in diabetes health outcomes in order to target
22 programs to those specific areas where deficiencies exist. Collection of racial and ethnic health services
23 data from all health activities is thus critical.
24

25 **Progress Toward Year 2000 Objectives**

26
27 In Healthy People 2000, diabetes was included in Chapter 17, which represents a group of chronic
28 conditions linked by their potential impact on quality of life and disability. For the objectives in Priority
29 Area 17, data are available to assess progress in 17 of the 23 areas. For the nondiabetes objectives, three
30 (17.7, 17.13, 17.22) are moving toward the targets established for the year 2000. Eight nondiabetes
31 objectives (17.1, 17.2, 17.4-17.6, 17.8, 17.12, 17.21) are moving away from the 2000 targets, i.e., recent
32 data indicate a worsening of health status in these areas.
33

34 Within the five diabetes objectives of Healthy People 2000, 17.23, eye examinations, is moving toward
35 the 2000 goal of 70 percent of persons with diabetes having an annual dilated eye exam. Mortality from
36 diabetes (17.9), noneye diabetes complications (17.10), and diabetes incidence and prevalence (17.11) are
37 moving away from the 2000 goal. Finally, diabetes education (17.14) appears to be increasing in
38 frequency among persons with diabetes.
39

40 These changes in direction need to be carefully considered regarding significance, causes, and
41 implications. For example, regarding persons with diabetes experiencing end-stage renal disease (ESRD),
42 the data suggest a substantial worsening. However, in past years, persons with diabetes and renal failure
43 were considered poor risk for ESRD programs, e.g., transplantation, dialysis. Hence, persons with
44 diabetes and renal failure were not included in such programs, and thus the prevalence of diabetes-related
45 ESRD was quite low. Presently, kidney failure due to diabetes is no longer considered a reason for
46 exclusion from ESRD programs. Thus, an apparent “epidemic” of diabetes-related ESRD is mainly due
47 to program inclusion, i.e., ascertainment. Similarly, while the incidence of Type 2 diabetes may be truly
48 increasing in association with obesity and inactivity, the prevalence of diabetes that is also steadily
49 “worsening” is likely secondary to increased efforts to screen for previously undiagnosed diabetes as well

as decreased mortality from such conditions as diabetic ketoacidosis and amputations. Thus, an increased prevalence of Type 2 diabetes may in part reflect successes in various prevention programs.

Draft 2010 Objectives

In considering opportunities for interventions that would reduce the burden of diabetes, the “natural history” of diabetes identifies four transition steps/points:

1. Transition Point 1: From No Diabetes to Diabetes Present (although not recognized). Intervention—*Primary Prevention*
2. Transition Point 2: From Diabetes Not Recognized to Diabetes Recognized (but preventive diabetes care not provided). Intervention—*Screening/Early Diagnosis*
3. Transition Point 3: From Diabetes Not Receiving Care to Diabetes Care Applied. Intervention—*Access*
4. Transition Point 4: From Improper Care to Proper Care. Intervention—*Improved Quality of Care* (Secondary and Tertiary Prevention, i.e., glucose control and decreasing diabetes complications)

Each of these four transition points represents a diabetes prevention and control “site” that should be reflected in the diabetes objectives relevant for Healthy People 2010. Thus, the objectives are categorized as Burden of Disease (incidence, prevalence, undiagnosed diabetes, mortality, pregnancy complications, macrovascular, microvascular, and metabolic complications); Risk Reduction Behaviors (weight, physical activity); Laboratory Services (lipids, glycosylated hemoglobin, microalbumin); Health Provider Services (blood pressure measurement, eye exam, foot exam); Patient Protection (smoking, aspirin, self-glucose monitoring); and Diabetes Education. In general, these objectives measure both the processes and outcomes of preventive diabetes programs.

Burden of Disease: Incidence and Prevalence

1. (Former 17.11) Decrease the incidence of Type 2 diabetes to 2.5 per 1,000 persons per year. (Baseline: 3.6 per 1,000 persons in 1994)

Select Populations	1994
African American	Not available
American Indian/Alaska Native	Not available
Asian/Pacific Islander	Not available
Hispanic	Not available
White	Not available
Male	3.3
Female	3.7
People aged 0-44	1.6
People aged 45-64	7.2
People aged 65+	8.8

Target Setting Method: Retain year 2000 target.

Data Source: National Health Interview Survey (NHIS), CDC, NCHS.

2. (Former 17.11) Reduce the prevalence of diagnosed diabetes to less than 25 per 1,000 population. (Baseline: 30.8 per 1,000 population in 1994)

Select Populations	1994
African American	Not available
American Indian/Alaska Native	Not available
Asian/Pacific Islander	Not available
Hispanic	Not available
White	Not available
Male	28.8
Female	32.7
People aged 0-44	8.3
People aged 45-64	62.2
People aged 65-74	101.5
People aged ≥75	103.3

Target Setting Method: Retain year 2000 target.

Data Sources: National Health Interview Survey (NHIS), CDC, NCHS; Behavioral Risk Factor Surveillance System (BRFSS), CDC, NCCDPHP, American Indian and Alaska Native Data, IHS.

3. Increase to 80 percent the proportion of persons with diabetes whose condition has been diagnosed. (Baseline: 65 percent in persons aged 20 and older in 1988-94)

Select Populations	1988-1994
African American	67%
American Indian/Alaska Native	Not available
Asian/Pacific Islander	Not available
Hispanic	Not available
Cuban	Not available
Mexican American	62%
Puerto Rican	Not available
White	67%
Male	62%
Female	69%
People aged 20-39	65%
People aged 40-49	61%
People aged 50-59	63%
People aged 60-74	67%
People aged ≥75	70%

Target Setting Method: Better than the best.

Data Source: National Health and Nutrition Examination Survey (NHANES), CDC, NCHS; Behavioral Risk Factor Surveillance System (BRFSS), CDC, NCCDPHP.

Diabetes is increasingly common in the United States and the world. Many factors could be contributing to this “chronic disease epidemic,” including increased incidence, decreased mortality, and improved detection. Given the seriousness and cost associated with diabetes and the complexities of diabetes, possible factors that account for these “commonness trends” should be carefully identified.⁵⁸⁻⁶¹

Mortality

- 4. (Former 17.9) Reduce the diabetes death rates (diabetes as underlying cause) to no more than 12.0 per 100,000 persons.** (Baseline: 13.3 per 100,000 persons in 1995)

Select Populations	1995
African American	28.5
American Indian/Alaska Native	27.3
Asian/Pacific Islander	9.2
Hispanic	19.3
White	11.7
Male	14.4
Female	12.4
People aged 0-44	1.5
People aged 45-64	23.3
People aged 65-74	86.5
People aged ≥75	191.0

Target Setting Method: 10 percent improvement.

Data Source: National Vital Statistics System (NVSS), CDC, NCHS.

- 5. Reduce diabetes-related deaths (diabetes as any listed cause of death) to no more than 2,033 per 100,000 known persons with diabetes.** (Baseline: 2,140 per 100,000 known persons with diabetes in 1994)

Select Populations	1994
African American	Not available
American Indian/Alaska Native	Not available
Asian/Pacific Islander	Not available
Hispanic	Not available
White	Not available
Male	2,350
Female	1,972
People aged 0-44	337
People aged 45-64	1,022
People aged 65-74	2,727
People aged ≥75	6,246

Target Setting Method: 5 percent improvement.

Data Sources : National Vital Statistics System (NVSS) and National Health Interview Survey (NHIS), CDC, NCHS.

6. Reduce deaths due to cardiovascular disease in people with diabetes to no more than 850 per 100,000 diabetic population. (Baseline: 939 per 100,000 diabetic population in 1994)

Select Populations	1994
African American	Not available
American Indian/Alaska Native	Not available
Asian/Pacific Islander	Not available
Hispanic	Not available
White	Not available
Male	1,046
Female	851
People aged 0-44	79
People aged 45-64	422
People aged 65-74	1,209
People aged ≥75	2,869

Target Setting Method: 10 percent improvement.

Data Sources: National Vital Statistics System (NVSS) and National Health Interview Survey (NHIS), CDC, NCHS; State data: State vital statistics and Behavioral Risk Factor Surveillance System (BRFSS), CDC, NCCDPHP.

Persons with diabetes experience mortality rates 2 to 4 times greater than the nondiabetic persons, especially from cardiovascular disease. Other causes of death include ESRD, diabetic acidosis, and infection. Recent studies indicate that both cardiac and noncardiac causes of death in persons with diabetes can be prevented and certainly delayed with secondary and tertiary prevention programs. Further, mortality rates and their significance are complicated by the degree of ascertainment of diabetes as recorded on death certificates. Thus, attention to both prevention behaviors to control mortality, as well as mortality rates themselves, should be carefully examined.⁶²⁻⁶⁵

Pregnancy

7. (Developmental/Former 17.17) Reduce perinatal mortality in infants of mothers with diabetes to no more than __ per 1,000 births.

Potential Data Source: National Vital Statistics System (NVSS), CDC, NCHS.

8. (Developmental/Former 17.10) Reduce the frequency of major congenital malformations in infants of mothers with diabetes to no more than _ per 1,000 births.

Studies of diabetes and pregnancy are consistent in their conclusions that proper prepregnancy and pregnancy glycemia control and careful perinatal obstetrical monitoring are associated with reduction in perinatal mortality and congenital abnormalities.⁶⁶⁻⁶⁸

Microvascular/ Metabolic Complications

9. (Developmental) Reduce the frequency of foot ulcers to no more than __ per 1,000 persons with diabetes.

Potential Data Sources: National Health Interview Survey (NHIS), CDC, NCHS, and Behavioral Risk Factor Surveillance System (BRFSS), CDC, NCCDPHP could be modified.

10. (Former 17.10) Reduce the frequency of lower extremity amputations to 5 per 1,000 persons with diabetes. (Baseline: 8.4 per 1,000 persons with diabetes in 1994)

Select Populations	1994
African American	9.3
American Indian/Alaska Native	Not available
Asian/Pacific Islander	Not available
Hispanic	Not available
White	5.7
Male	10.9
Female	6.2
People aged 0-64	6.5
People aged 65-74	10.2
People aged ≥ 75	11.9

Target Setting Method: 40 percent improvement.

Data Sources: National Hospital Discharge Survey (NHDS) and National Health Interview Survey (NHIS), CDC, NCHS.

11. (Developmental) Reduce the frequency of significant visual impairment to __ per 1,000 persons with diabetes.

Potential Data Sources: National Health Interview Survey (NHIS) (core and periodic module), CDC, NCHS; Behavioral Risk Factor Surveillance System (BRFSS), CDC, NCCDPHP.

12. (Developmental/Former 17.10) Reduce the frequency of blindness due to diabetes to no more than __ per 1,000 persons with diabetes.

13. (Developmental) Reduce the frequency of proteinuria (microalbuminuria) to no more than __ per 1,000 persons with diabetes.

Potential Data Source: National Health and Nutrition Examination Survey (NHANES), CDC, NCHS.

14. (Former 17.10) Decrease the prevalence of end-stage renal disease due to diabetes requiring dialysis or transplantation to no more than 70 per 1,000,000 population. (Baseline: 73.8 ESRD-diabetes per 1,000,000 persons in 1993)

Select Populations	1993
African American	Not available
American Indian/Alaska Native	Not available
Asian/Pacific Islander	Not available
Hispanic	Not available
White	Not available
Male	72.4
Female	75.0
People aged 0-34	8.1
People aged 35-44	42.7
People aged 45-54	105.2
People aged 55-64	235.7
People aged 65-74	323.7
People aged ≥75	155.5

Target Setting Method: 5 percent improvement.

Data Source: U.S. Regional Disease System (USRDS), HCFA.

Convincing, consistent, and continuing scientific evidence exists that with secondary and tertiary prevention, microvascular complications of diabetes can be substantially reduced. Improved quality of life, diminished mortality, and improved economics all can result from improved clinical and public health diabetes prevention strategies directed to microvascular and metabolic complications of diabetes. Monitoring the consequences of these strategies through reduction in mid- and end-stage microvascular complications should be an important component of the effectiveness of national diabetes activities.⁶⁹⁻⁷²

Risk Reduction

Improper nutrition, obesity, and inactivity appear to be significant risk factors for the development of Type 2 diabetes (See Chapter 1—Physical Activity and Fitness, and Chapter 2—Nutrition). In addition, in persons with diabetes, nutrition, weight, and physical activity components are particularly critical in both glucose management and blood pressure and lipid control. Thus, these components are closely related to abilities to control both micro- and macrovascular diabetic complications. Given the discouraging trends in obesity and physical inactivity, these elements should be particularly and carefully monitored in persons with diabetes.⁷³⁻⁷⁵

Services and Protection Objectives

Laboratory Assessment

15. (Developmental) Increase to at least __ percent the proportion of patients with diabetes who annually obtain lipid assessment (total cholesterol, LDL cholesterol, HDL cholesterol, triglyceride).

Potential Data Sources: National Health Interview Survey (NHIS), CDC, NCHS; Behavioral Risk Factor Surveillance System (BRFSS) cholesterol module, CDC, NCCDHP.

16. (Developmental) Increase to __ percent the proportion of persons with diabetes who have a glycosylated hemoglobin measurement at least once a year.

Potential Data Sources: National Health Interview Survey (NHIS), CDC, NCHS; Behavioral Risk Factor Surveillance System (BRFSS) diabetes module, CDC, NCCDPHP.

17. (Developmental) Increase to __ percent the proportion of persons with diabetes who have at least an annual urinary measurement of microalbumin.

During the past decade, scientific investigations have established that controlling certain macrovascular risk factors, e.g. lipids, as well as microvascular factors, e.g blood glucose, will result in fewer diabetes-related complications. Further, identification of early indicators of organ damage, e.g., microalbuminuria, and proper treatment with “ACE-inhibitors” will reduce progression to renal failure. These laboratory indicators of diabetes prevention and control activities should be monitored.⁷⁶⁻⁷⁸

Health Provider Services

18. (Developmental) Increase to __ percent the proportion of persons with diabetes who have adequately controlled blood pressure.

Potential Data Sources: National Health and Nutrition Examination Survey (NHANES); National Health Interview Survey (NHIS), CDC, NCHS; Behavioral Risk Factor Surveillance System (BRFSS), CDC, NCCDPHP.

19. (Former 17.23) Increase to 73 percent the proportion of persons with diabetes who have an annual dilated eye examination. (Baseline: 52 percent of persons 18 years and older with diabetes in 1988-91)

Target Setting Method: 40 percent improvement.

Data Sources: National Health and Nutrition Examination Survey (NHANES), CDC, NCHS; Behavioral Risk Factor Surveillance System (BRFSS) diabetes module, CDC, NCCDPHP.

20. (Developmental) Increase to __ percent the proportion of persons with diabetes who have at least an annual foot examination.

Potential Data Sources: National Health Interview Survey (NHIS) and Behavioral Risk Factor Surveillance System (BRFSS) diabetes module, CDC, NCHS.

Evidence has long existed, and has been recently further supported, to indicate that health practitioner behaviors, e.g., blood pressure monitoring, eye and foot examinations, are associated with greater attention to early indicators of end-organ damage, and thus better secondary and tertiary prevention programs. These behaviors should be monitored.⁷⁹⁻⁸¹

Patient Protection

Discussion of tobacco use is contained in Chapter 3—Tobacco Use.

21. (Developmental) Increase to __ percent the proportion of persons with diabetes over 40 years of age who regularly take aspirin.

Potential Data Sources: National Health and Nutrition Examination Survey (NHANES), Behavioral Risk Factor Surveillance System (BRFSS) cardiovascular disease module, CDC, NCCDPHP; National Health Interview Survey (NHIS), CDC, NCHS, could be modified.

22. (Developmental) Increase to __ percent the proportion of persons with diabetes who perform self-blood glucose monitoring at least daily.

Potential Data Sources: Behavioral Risk Factor Surveillance System (BRFSS) diabetes module, CDC, NCCDPHP; National Health Interview Survey (NHIS), CDC, NCHS, could be modified.

Certain activities, ultimately decided by the patient him or herself, are essential in the proper preventive management of diabetes. Smoking cessation, use of aspirin, self-blood glucose monitoring, etc., are representative of these individual behaviors that should be periodically monitored.⁸²⁻⁸⁵

23. (Former 17.14) Increase to 52 percent the proportion of persons with diabetes who have received formal diabetes education. (Baseline: 43 percent in 1993)

Select Populations	1993
African American	50%
American Indian/Alaska Native	Not available
Asian/Pacific Islander	Not available
Hispanic	26%
White	Not available
Male	Not available
Female	Not available
Children aged 0-17	Not available
People aged 18-44	Not available
People aged 45-64	Not available
People aged 65-74	Not available
People aged ≥75	Not available

Target Setting Method: 20 percent improvement.

Data Sources: National Health Interview Survey (NHIS), CDC, NCHS; Behavioral Risk Factor Surveillance System (BRFSS), CDC, NCCDPHP, could be modified.

Diabetes patient education is uniformly viewed as effective and economical in the ultimate prevention of longer term complications of diabetes. An individual with diabetes spends less than 0.5 percent of his or her time in contact with the health care system and thus must make a variety of critical decisions about diabetes on a daily basis. Thus, an informed and motivated patient is essential, and diabetes education programs should be monitored.^{86,87}

Related Objectives From Other Focus Areas

Physical Activity and Fitness

- 1 Leisure time physical activity
- 2 Sustained physical activity
- 3 Vigorous physical activity

Nutrition

- 1 Healthy weight
- 2 Obesity in adults
- 3 Overweight and obesity in children/adolescents

Access to Quality Health Services

B.6 Preventable hospitalization rates for chronic illness

Heart Disease and Stroke

- 1 Coronary heart disease deaths
- 2 Female deaths after heart attack
- 3 Knowledge of early warning symptoms of heart attack
- 4 Provider counseling about early warning symptoms of heart attack
- 5 Females aware of heart disease as the leading cause of death
- 6 High blood pressure
- 7 Controlled high blood pressure
- 8 Action to help control blood pressure
- 9 Blood pressure monitoring
- 10 Serum cholesterol levels
- 11 Blood cholesterol levels
- 12 Blood cholesterol screening
- 13 Treatment of LDL cholesterol

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